33. A method of preparing a human B4 cell population, comprising

a) exposing a cell suspension comprising a non-enriched, heterogeneous kidney cell population to hypoxic culture conditions; and

b) extracting a first cell fraction comprising the B4 cell population.

34. The method of claim **33**, wherein the B4 cell population comprises a greater proportion of EPO-producing cells, vascular cells and glomerular cells and a lesser proportion of non-EPO producing cells, non-vascular cells, and non-glomerular cells when compared to the non-enriched cell population.

35. The method of claim **33**, further comprising a step between step a) and step b), comprising contacting the cell suspension with a density gradient to separate one or more cell fractions, wherein the first cell fraction is present in the gradient after centrifugation at a specific density between about 1.063 g/mL and about 1.091 g/mL.

36. A method of generating a B2 cell preparation, comprising

a) exposing a cell suspension comprising a non-enriched, heterogeneous kidney cell population to hypoxic culture conditions;

b) applying the cell suspension to a flow cytometric instrument capable of simultaneous measurement of forward scatter and side scatter in one or more individual cells within the cell population;

c) selecting a cell subpopulation from the cell population;

d) sorting a cell subpopulation from the cell population; and

e) isolating the B2 cell subpopulation from the cell population,

wherein the B2 cell subpopulation is characterized by high forward scatter and high side scatter relative to the majority of the population.

37. A method of generating a B4 cell preparation, comprising

a) exposing a cell suspension comprising a non-enriched, heterogeneous kidney cell population to hypoxic culture conditions;

b) applying the cell suspension to a flow cytometric instrument capable of simultaneous measurement of forward scatter and side scatter in one or more individual cells within the cell population;

c) selecting a cell subpopulation from the cell population;

d) sorting a cell subpopulation from the cell population; and

e) isolating the B4 cell subpopulation from the cell population,

wherein the B4 cell subpopulation is characterized by low forward scatter and low side scatter relative to the majority of the population.

38. The method of claim **36** or **37** wherein the forward scatter corresponds to cell size.

39. The method of claim **36** or **37** wherein the side scatter corresponds to cell granularity.

40. An implantable construct for providing improved kidney function to a subject in need comprising:

a) a biomaterial comprising one or more biocompatible synthetic polymers or naturally-occurring proteins or peptides; and

b) an admixture of mammalian renal cells comprising a first cell population, B2, and a second cell population, coated with, deposited on or in, entrapped in, suspended in, embedded in and/or otherwise combined with the biomaterial.

41. The implantable construct of claim **40**, wherein the second cell population is B4.

42. The implantable construct of claim **40**, wherein the second cell population is B3.

43. The construct of claim **40** wherein the admixture is derived from mammalian kidney tissue or cultured kidney cells.

44. The construct of claim **40** wherein the biomaterial is configured as a three-dimensional (3-D) porous biomaterial suitable for entrapment and/or attachment of the admixture.

45. The construct of claim **40** wherein the biomaterial is configured as a liquid or semi-liquid gel suitable for embedding, attaching, suspending, or coating mammalian cells.

46. The construct of claim **40**, wherein the biomaterial is comprised of a predominantly high-molecular weight species of hyaluronic acid (HA) in hydrogel form.

47. The construct of claim **40**, wherein the biomaterial is comprised of a predominantly high-molecular weight species of hyaluronic acid in porous foam form.

48. The construct of claim **40**, wherein the biomaterial is comprised of a poly-lactic acid-based foam having pores of between about 50 microns to about 300 microns.

49. The construct of claim **40** wherein the cell population is derived from an autologous kidney sample.

50. The construct of claim **49** wherein the sample is a kidney biopsy.

51. The construct of claim **40** wherein the cell population is derived from a non-autologous kidney sample.

52. The construct of claim **40**, wherein the improved kidney function is erythroid homeostasis.

53. A method of treating a kidney disease in a subject in need, comprising:

a) administering to the subject a composition comprising an admixture of mammalian renal cells comprising a first cell population, B2, and a second cell population; and

b) determining in a test sample from the subject that the level of a kidney function indicator is different relative to the indicator level in a control, wherein the difference in indicator level is indicative of a reduction in decline, a stabilization, or an improvement of one or more kidney functions in the subject.

54. The method of claim **53**, wherein the second cell population is B4.

55. The method of claim **53**, wherein the second cell population is B3.

56. The method of claim **53**, wherein the kidney disease is accompanied by an erythropoietin (EPO) deficiency.

57. The method of claim **56** wherein the EPO deficiency is anemia.

58. The method of claim **56** wherein the EPO deficiency or anemia occurs secondary to renal failure in the subject.

59. The method of claim **56** wherein the EPO deficiency or anemia occurs secondary to a disorder selected from the group consisting of chronic renal failure, primary EPO deficiency, chemotherapy or anti-viral therapy, non-myeloid cancer, HIV infection, liver disease, cardiac failure, rheumatoid arthritis, or multi-organ system failure.

60. The method of claim **34** wherein the composition further comprises a biomaterial comprising one or more biocompatible synthetic polymers and/or naturally-occurring pro-